WHAT IS CLAIMED IS:

1. An electrode material for an anode of a rechargeable lithium battery, containing a particulate comprising an amorphous Sn·A·X alloy with a substantially non-stoichiometric ratio composition. [For said formula Sn·A·X, A indicates at least one kind of an element selected from a group consisting of transition metal elements, X indicates at least one kind of an element selected from a group consisting of O, F, N, Mg, Ba, Sr, Ca, La, Ce, Si, Ge, C, P, B, Bi, Sb, Al, In, and Zn, where the element X is not always necessary to be contained. The content of the constituent element Sn of the amorphous Sn·A·X alloy is Sn/(Sn + A + X) = 20 to 80 atomic%.]

2. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy has a peak appeared in a range of $2\theta = 25^\circ$ to 50° in X-ray diffraction using $K\alpha$-rays of Cu as a radiation source, having a half width of more than 0.2°.

3. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy has a peak appeared in a range of $2\theta = 25^\circ$ to 50° in X-ray diffraction using $K\alpha$-rays of Cu as a radiation source, having a half width of more than 0.5°.

4. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy has a

peak appeared in a range of $2\theta = 25°$ to $50°$ in X-ray diffraction using $K\alpha$-rays of Cu as a radiation source, having a half width of more than $1.0°$.

5. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy has a peak appeared in a range of $2\theta = 40°$ to $50°$ in X-ray diffraction using $K\alpha$-rays of Cu as a radiation source, having a half width of more than $0.5°$.

6. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy has a peak appeared in a range of $2\theta = 40°$ to $50°$ in X-ray diffraction using $K\alpha$-rays of Cu as a radiation source, having a half width of more than $1.0°$.

7. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy has a crystallite size calculated from X-ray diffraction analysis, which is less than 500 Å.

8. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy has a crystallite size calculated from X-ray diffraction analysis, which is less than 200 Å.

9. An electrode material for an anode according to claim 1, wherein said particulate comprising said

amorphous Sn·A·X alloy has a crystallite size calculated from X-ray diffraction analysis, which is less than 100 Å.

10. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy has an average particle size in a range of from 0.5 µm to 20 µm.

11. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy has an average particle size in a range of from 0.5 µm to 10 µm.

12. An electrode material for an anode according to claim 1, wherein said transition metal element comprises at least one kind of an element selected from a group consisting of Cr, Mn, Fe, Co, Ni, Cu, Mo, Tc, Ru, Rh, Pd, Ag, Ir, Pt, Au, Ti, V, Y, Sc, Zr, Nb, Hf, Ta, and W.

13. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy contains said alloy in an amount of more than 30 % by weight.

14. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy contains a binder comprising a polymer which is either water-soluble or water-insoluble.

15. An electrode material for an anode according to claim 14, wherein said particulate comprising said amorphous Sn·A·X alloy contains said alloy in an amount in a range of from 80 % by weight to 100 % by weight.

16. An electrode material for an anode according to claim 14, wherein the amount of said binder contained is in a range of from 1 % by weight to 10 % by weight.

17. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy contains oxygen element.

18. An electrode material for an anode according to claim 17, wherein the amount of said oxygen element contained is in a range of from 0.05 % by weight to 5 % by weight.

19. An electrode material for an anode according to claim 17, wherein the amount of said oxygen element contained is in a range of from 0.1 % by weight to 3 % by weight.

20. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy contains fluorine element.

21. An electrode material for an anode according to claim 20, wherein the amount of said fluorine element contained is 5 % by weight or less.

22. An electrode material for an anode according

to claim 20, wherein the amount of said fluorine element contained is 3 % by weight or less.

23. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy contains carbon element.

24. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains at least one kind of an element selected from a group (a) consisting of Pb, Bi, Al, Ga, In, Tl, Zn, Be, Mg, Ca, and Sr; a group (b) consisting of rare earth elements; and a group (c) consisting of metalloide elements.

25. An electrode material for an anode according to claim 24, wherein said amorphous Sn·A·X alloy contains two kinds of elements selected from said group (a), said group (b), and said group (c).

26. An electrode material for an anode according to claim 24, wherein said amorphous Sn·A·X alloy contains three kinds of elements selected from said group (a), said group (b), and said group (c).

27. An electrode material for an anode according to claim 24, wherein said group (b) consisting of rare earth elements consists of La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu, and said group (c) consisting of metalloide elements consists of B, C, Si, P, Ge, As, Se, Sb, and Te.

28. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains one kind of an element selected from a group consisting of Pb, Bi, Al, Ga, In, Tl, Zn, Be, Mg, Ca, and Sr and one kind of an element selected a group consisting of rare earth elements.

29. An electrode material for an anode according to claim 28, wherein said group consisting of rare earth elements consists of La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu.

30. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains one kind of an element selected from a group consisting of Pb, Bi, Al, Ga, In, Tl, Zn, Be, Mg, Ca, and Sr and one kind of an element selected a group consisting of metalloide elements.

31. An electrode material for an anode according to claim 30, wherein said group consisting of metalloide elements consists of B, C, Si, P, Ge, As, Se, Sb, and Te.

32. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains, at least, one kind of an element selected from a group consisting of metalloide elements and one kind of an element selected a group consisting of rare earth elements.

33. An electrode material for an anode according

to claim 32, wherein said group consisting of rare earth elements consists of La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu, and said group consisting of metalloide elements consists of B, C, Si, P, Ge, As, Se, Sb, and Te.

34. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains one kind of an element selected from a group consisting of Si, Ge, Al, Zn, Ca, La, and Mg, and one kind of an element selected from a group consisting of Co, Ni, Fe, Cr, and Cu.

35. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains one kind of an element selected from a group consisting of Si, Ge, Al, Zn, Ca, La, and Mg, one kind of an element selected from a group consisting of Co, Ni, Fe, Cr, and Cu, and one kind of an element selected from a group consisting of C, B, and P.

36. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy has an average particle size in a range of from 0.5 µm to 20 µm.

37. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy has a specific surface area of more than 1 m^2/g.

38. An electrode material for an anode according to claim 1, wherein said particulate comprising said amorphous Sn·A·X alloy has a specific surface area of more than 5 m^2/g.

39. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains Li element in a range of from 2 atomic% to 30 atomic%.

40. An electrode material for an anode according to claim 1, wherein said amorphous Sn·A·X alloy contains at least one kind of an element selected from a group consisting of N and S in an amount in a range of from 1 atomic% to 30 atomic%.

41. An electrode structural body comprising said electrode material for an anode containing said particulate comprising said amorphous Sn·A·X alloy defined in ~~any of claims 1 to 39~~ claim 1 and a collector comprising a material incapable of being alloyed with lithium in electrochemical reaction.

42. An electrode structural body according to claim 41, wherein said electrode material is formed on said collector.

43. An electrode structural body according to claim 41, wherein the amount of said particulate comprising said amorphous Sn·A·X alloy in said electrode structural body is at least 25 % by weight.

44. An electrode structural body according to claim 41, wherein said particulate comprising said amorphous Sn·A·X alloy in said electrode structural body contains at least 30 % by weight of said amorphous Sn·A·X alloy.

45. An electrode structural body according to claim 41, wherein said electrode structural body has an electrode material layer comprising said electrode material for an anode and a binder on said collector.

46. An electrode structural body according to claim 45, wherein said binder comprises a polymer which is either water-soluble or water-insoluble.

47. A rechargeable lithium battery having an anode, an electrolyte, and a cathode and in which oxidation-reduction reaction of lithium is used, characterized in that said anode comprises said electrode structural body defined in any of claims 41 to 46.

48. A rechargeable lithium battery according to claim 47, wherein said cathode comprises a lithium element-containing material having a function of deintercalating lithium ion and intercalating said lithium ion in charge-and-discharge reaction.

49. A rechargeable lithium battery according to claim 47, wherein said lithium element-containing material as the constituent material of said cathode

contains an amorphous phase.

50. A rechargeable lithium battery according to claim 47, wherein said lithium element-containing material as the constituent material of said cathode contains a metal oxide material containing amorphous phase.

51. A process for producing an electrode structural body for a rechargeable lithium battery, said process is characterized by having a step of arranging said electrode material for an anode containing said particulate comprising said amorphous Sn·A·X alloy defined in ~~any of claims 1 to 40~~ claim 1 on a collector.

52. A process for producing an electrode structural body for a rechargeable lithium battery according to claim 51, wherein said step includes a step of arranging said particulate comprising said amorphous Sn·A·X alloy on said collector by way of press forming.

53. A process for producing an electrode structural body for a rechargeable lithium battery according to claim 51, wherein said step includes a step of preparing a paste material by mixing said particulate comprising said amorphous Sn·A·X alloy with a binder and arranging said paste material on said collector.

54. A process for producing an electrode structural body for a rechargeable lithium battery

according to claim 53, wherein a binder comprising a water-soluble polymer material is used as said binder.

55. A process for producing a rechargeable lithium battery having an anode, an electrolyte, and a cathode and in which oxidation-reduction reaction of lithium is used, said process is characterized by having a step of forming said anode by arranging said electrode material for an anode containing said particulate comprising said amorphous Sn·A·X alloy defined in ~~any of claims 1 to 40~~ claim 1 on a collector.

56. A process for producing a rechargeable lithium battery according to claim 55, wherein said step of forming said anode includes a step of arranging said particulate comprising said amorphous Sn·A·X alloy on said collector by way of press forming.

57. A process for producing a rechargeable lithium battery according to claim 55, wherein said step of forming said anode includes a step of preparing a paste material by mixing said particulate comprising said amorphous Sn·A·X alloy with a binder and arranging said paste material on said collector.

58. A process for producing a rechargeable lithium battery according to claim 57, wherein a binder comprising a water-soluble polymer material is used as said binder.